AMENDMENTS TO THE DRAWINGS

Please replace Figures 10 and 11 with "Replacement Figure" 10 and 11 (see attached).

REMARKS

Summary of the Amendment

Upon entry of the present Amendment, Claims 1-4 and 6 will have been amended, and Claims 5 and 7 will have been deleted. Further, it is noted that Claims 3 and 4 have been amended such that they are now in independent form, instead of dependent form.

Summary of the Office Action

Figures 9-10 and Claim 2 have been objected to for various formal reasons. Claim 6 is rejected under 35 U.S.C. § 112, second paragraph as being indefinite. On the merits of patentability, Claims 1-4 and 6 have been rejected under 35 U.S.C. § 102(b) as being anticipated by art of record. The aforementioned matters are now herein discussed in greater detail below.

Objection to the Drawings

The drawings are objected to because the Examiner submits that Figures 9-10 are not designated by a "Prior Art" legend. It appears the Examiner intended to object to Figures 10-11, since Fig. 9, as filed, is clearly designated "Prior Art" by a legend.

In view of the aforementioned objection to Figures 11 and 12, Applicant has submitted "Replacement Figures" 11 and 12.

Accordingly, Applicant respectfully requests that the Examiner withdraw the objection to the drawings and indicate their approval in the next Office Action.

Claim Objections

Claim 2 is objected to because in line 1, "A" should be changed to --- An --- . As suggested by the Examiner, Applicant has made the aforementioned amendment.

Traversal of Rejection under 35 U.S.C. § 112-2

Claim 6 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The Examiner submits that in line 3, the feature

"movable photoreceptor elements" is not clear. In particular, the Examiner submits that it is not clear whether the photoreceptor elements physically change location during operation or if movement is indicated by processing circuits through phase shifts in signals from the light emitters.

Applicant has amended Claim 6 in an effort to make the claim even more clear and definite than originally presented. In particular, Claim 6 now recites, *inter alia*, . . . *a plurality of photoreceptor elements each of which is positioned based on a pitch of the optical grating which is movable with respect to the photoreceptor elements*; . . . As presented, Applicant believes the aforementioned rejection has now been overcome.

In view of the foregoing, Applicant submits that Claim 6 is clear and definite, and therefore, complies with 35 U.S.C. § 112, second paragraph.

Accordingly, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of Claim 6 under 35 U.S.C. § 112, second paragraph.

Traversal of Rejection under 35 U.S.C. § 102(b)

Claims 1-4 and 6 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Publication No. 20002/0000514 A1 to Haas et al. [hereinafter "HAAS"].

With regard to Claim 1, the Examiner submits that HAAS shows in Fig. 1A a scale (2, i.e., grid plate) having an optical grating; a plurality of photoreceptor elements (contained within photo receiver (3)) that are movable with respect to the scale and that are disposed in relation to the pitch of the optical grating; light source means (1, i.e., emission device) having at least two light sources for irradiating the photoreceptor elements through the scale by using light rays from at least two different directions; and control means (7, i.e., control device) for switching light-emitting status of the at least two light sources; wherein the control means (combination of control device (7) and evaluation circuit (4)) obtains relative-position information of the scale and the photoreceptor elements by processing information obtained from the light-emitting status of the light sources when the light-emitting status of the light sources is switched (paragraph [0028], lines 8-11, and [0029], lines 9-11).

With regard to Claim 6, the Examiner submits that HAAS shows in Fig. 1A a scale (2, i.e., grid plate); a plurality of movable photoreceptor elements (3, i.e., photo

receiver) wherein each photoreceptor is positioned based on a pitch of the optical grating; first light source (11, i.e., laser diode) and second light source (11, i.e., laser diode) providing light to the photoreceptor elements, wherein the first light source provides light a first direction, and wherein the second light source provides light in a second direction; and a switch (combination of control device (7)) and evaluation circuit (6)) for controlling the light-emitting status of the first and second light source, wherein the switch is capable of using the light emitting status of the first and the second light sources to acquire relative-position information of the scale and the photoreceptor elements.

In re HAAS et al.:

HAAS discloses a method for a quantitative detection of linear movement or rotary movement. The method includes the steps of emitting radiation from at least two light emitters in a pulsed mode at a same clock frequency or different clock frequencies and detecting the radiation from the two light emitters by a detection device. It furthermore includes the steps of increasingly shadowing the radiations by a movable grid device or separating signals originating from different light emitters by an evaluation circuit coupled to the detection device.

It is further noted that HAAS discloses an optical encoder technology to obtain the two-phase signals which are phase-shifted through 90 degrees by using two light-emitting elements and the photoreceptor element. Thus, it appears HAAS uses the plurality of light-emitting elements while switching them instead of providing a plurality of sensors.

Aspects of the Present Invention:

One aspect of the present invention is to provide an optical encoder with further enhanced resolution than a conventional encoder by using signals having different phases which are obtained before and after switching a plurality of light-emitting elements.

Another aspect of the present invention is to obtain signals having a phase A and phase B by using a plurality of photoreceptor elements and also to obtain more precise position information by processing signals which are phase-shifted from the above two-phase signals and obtained by switching the light source.

Moreover, another aspect of the present invention is that the phase difference can fill the gap, therefore, the present invention can obtain precise signals which the 90 degrees phase difference is further resolved into.

Independent Claims 1 and 4 (and Dependent Claim 2):

As amended, Applicant's independent Claim 1 now recites, *inter alia*, . . . *wherein phase difference of the signals obtained from the photoreceptor elements before and after switching the light-emitting status is less than 90 degrees.*

On the other hand, HAAS does not teach the aforementioned. In particular, HAAS does not teach, *inter alia*, . . . *wherein phase difference of the signals obtained from the photoreceptor elements before and after switching the light-emitting status is less than 90 degrees.*

Because HAAS fails to disclose the above-noted features of the present invention, Applicant respectfully submits that HAAS fails to disclose each and every feature of the present invention as recited in independent Claims 1 and 4.

Accordingly, Applicant submits that the Examiner has failed to provide an adequate evidentiary basis to support a rejection of Claims 1 and 4 under 35 U.S.C. § 102(b) and that the rejection of independent Claims 1 and 4 is improper and should be withdrawn.

Applicant further submits that dependent Claim 2 is allowable at least for the reason that this claim depends from allowable independent Claim 1 and because this claim recites additional features that further define the present invention.

Accordingly, Applicant submits that the Examiner has failed to provide an adequate evidentiary basis to support a rejection of Claim 2 under 35 U.S.C. § 102(b) and that the rejection of Claim 2 is improper and should be withdrawn.

Independent Claim 3:

As amended, Applicant's independent Claim 3 now recites, *inter alia*, . . . *wherein the controller obtains relative-position information of the scale and the photoreceptor elements based on the intensity of the light portions and signals obtained before and after the light-emitting intensity of the light portions is changed.*

On the other hand, HAAS does not teach the aforementioned. In particular, HAAS does not teach, inter alia, . . . *wherein the controller obtains relative-position information of the scale and the photoreceptor elements based on the intensity of the light portions and signals obtained before and after the light-emitting intensity of the light portions is changed.*

Because HAAS fails to disclose the above-noted features of the present invention, Applicant respectfully submits that HAAS fails to disclose each and every feature of the present invention as recited in independent Claim 3.

Accordingly, Applicant submits that the Examiner has failed to provide an adequate evidentiary basis to support a rejection of Claims 1 and 4 under 35 U.S.C. § 102(b) and that the rejection of independent Claim 3 is improper and should be withdrawn.

Independent Claim 6:

As amended, Applicant's independent Claim 6 now recites, inter alia, . . . *wherein the controller is capable of acquiring relative-position information between the scale and the photoreceptor elements based on the intensity of the light emitting status and signals obtained from the plurality of photoreceptor elements before and after the intensity of the light-emitting status is controlled in a different status.*

On the other hand, HAAS does not teach the aforementioned. In particular, HAAS does not teach, inter alia, . . . *wherein the controller is capable of acquiring relative-position information between the scale and the photoreceptor elements based on the intensity of the light emitting status and signals obtained from the plurality of photoreceptor elements before and after the intensity of the light-emitting status is controlled in a different status.*

Because HAAS fails to disclose the above-noted features of the present invention, Applicant respectfully submits that HAAS fails to disclose each and every feature of the present invention as recited in independent Claim 6.

Accordingly, Applicant submits that the Examiner has failed to provide an adequate evidentiary basis to support a rejection of Claim 6 under 35 U.S.C. § 102(b) and that the rejection of independent Claim 6 is improper and should be withdrawn.

Application is Allowable

Applicant respectfully submits that each and every pending claim of the present invention meets the requirements for patentability and respectfully requests the Examiner to indicate allowance of each and every pending claim of the present invention.

CONCLUSION

Applicant respectfully submits that each and every pending claim of the present application meets the requirements for patentability under 35 U.S.C. §§ 112, 101, 102 and 103, and respectfully requests that the Examiner indicate the allowance of such claims.

Further, any amendments to the claims which have been made in this response and which have not been specifically noted to overcome a rejection based on the prior art, should be considered to have been made for a purpose unrelated to patentability, and no estoppel should be deemed to attach thereto.

Should there be any questions or comments, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,

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